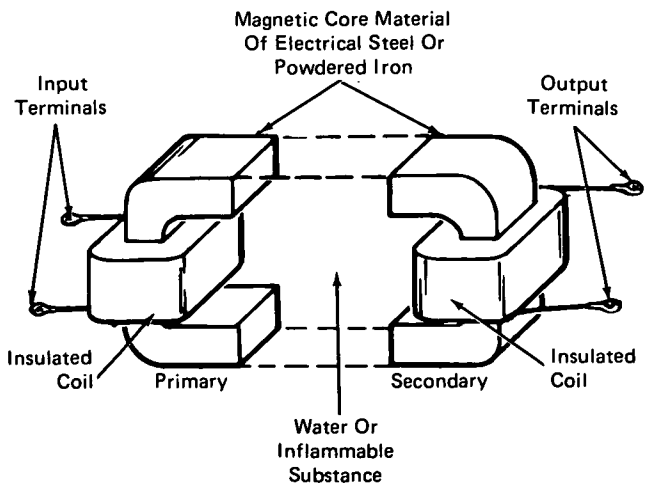
NASA TECH BRIEF

Lyndon B. Johnson Space Center

Electromagnetic Connector

The problem:

Electrical connectors are part of every electrical household appliance as well as of sophisticated electronic equipment. They are made in various sizes and shapes and provide a metal path between two or more electrical conductors. Metal connections made for electrical and electronics equipment are, however, not suitable for underwater applications nor in areas that contain explosive vapors. In the first case, the metal connection has to be protected from the water by expensive enclosures. In the second case, metal-to-metal contact may generate sparks during handling and trigger an explosion.



The solution:

An electrical connection utilizing magnetic induction can be used underwater and in a flammable atmosphere.

How it's done:

The electromagnetic connector pair, shown in the figure, closely resembles an electrical transformer. It contains two iron cores that are brought together to a short distance from each other. Each iron core is wound with an insulated wire. The primary core, corresponding to a transformer primary, is the input; the secondary, corresponding to a transformer secondary, is the output.

An ac signal is "connected" through the pair across the gap by magnetic induction. Since there is no need to mechanically connect the signal circuits, the gap between halves can be water or an explosive gas. This system can be either single-phase of multi-phase.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
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Code JM7
Houston, Texas 77058
Reference: TSP73-10125

Patent status:

NASA has decided not to apply for a patent.

Source: W. C. Gardner of
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Category 07, 02